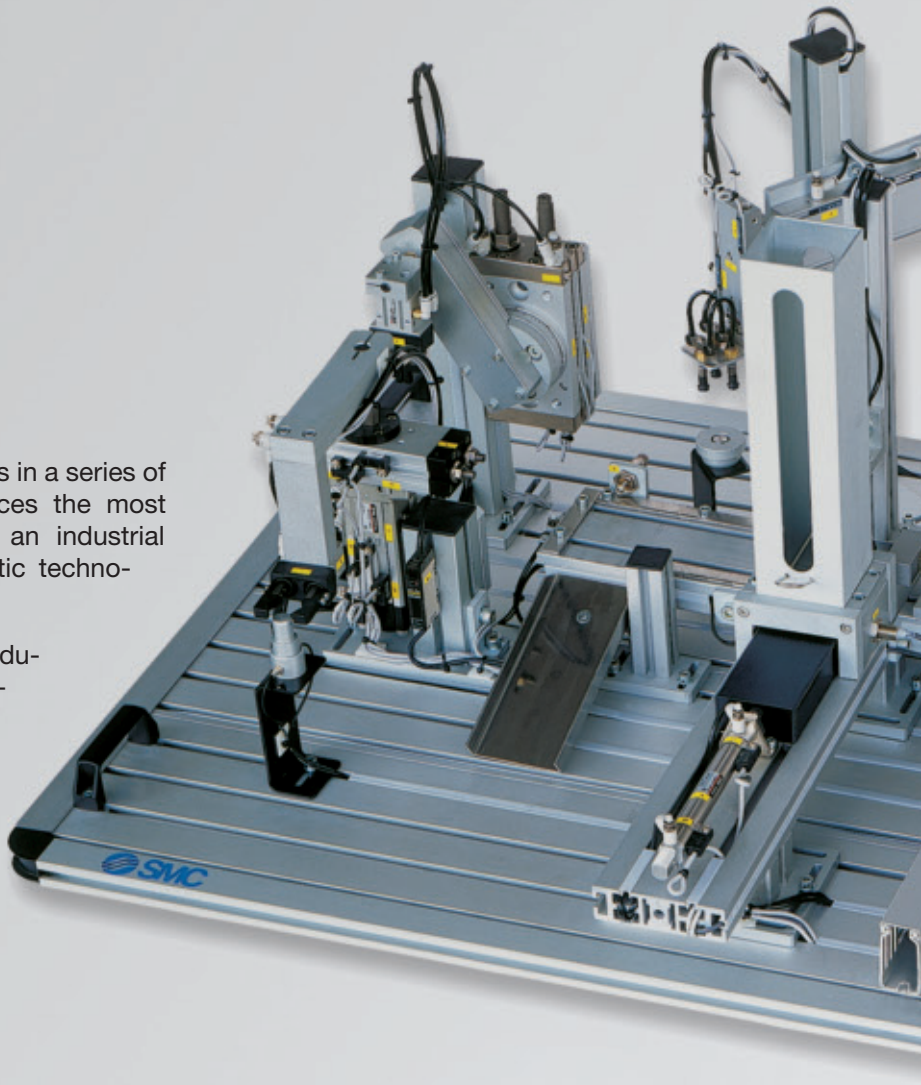
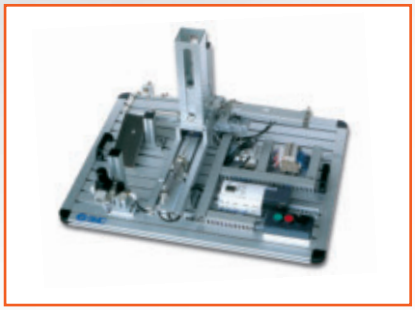
MAP-200

Handling system



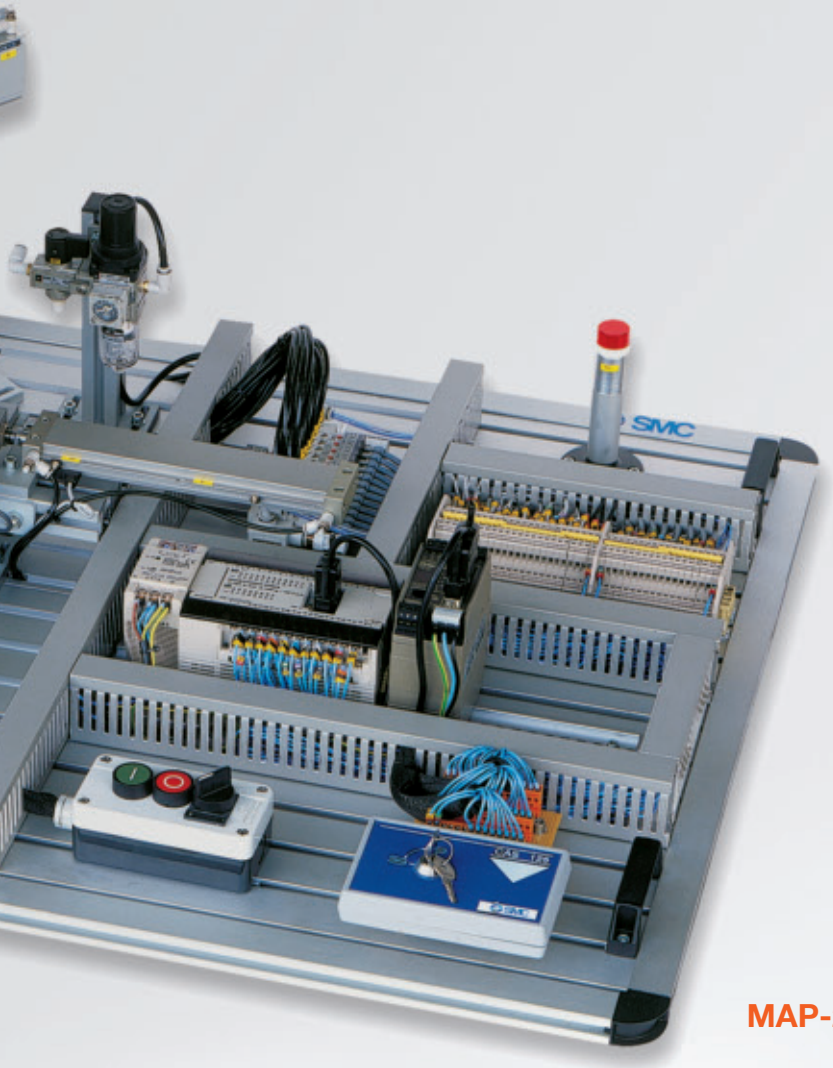
The study of the handling techniques in a series of training equipment which reproduces the most common handling applications in an industrial environment using electro-pneumatic technology.

Four different training systems reproduce simple electro-pneumatic handling processes while a fifth system consolidates the functions of the four previous ones, forming a small "assembly minicell".



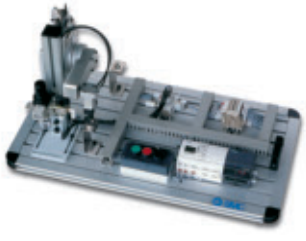
MAP-201

SMC
INTERNATIONAL TRAINING

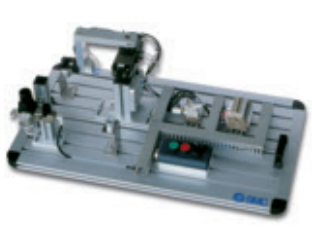


MAP-205

MAP-202



MAP-203



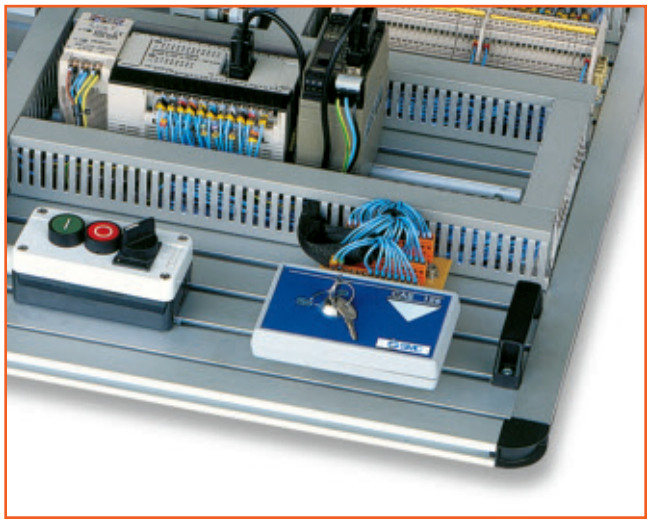
MAP-204

The solution for the study of industrial handling

- The MAP-200 series consists of four training systems to learn about the main handling applications used in electro-pneumatic technology. In each of these, a simple assembly process is carried out by reproducing more complex processes found in industry.

  A fifth handling device (MAP-205) integrates the functions of the other four in one system only. Moreover, it incorporates the troubleshooting system which generates up to 16 different breakdowns to be identified by the user.

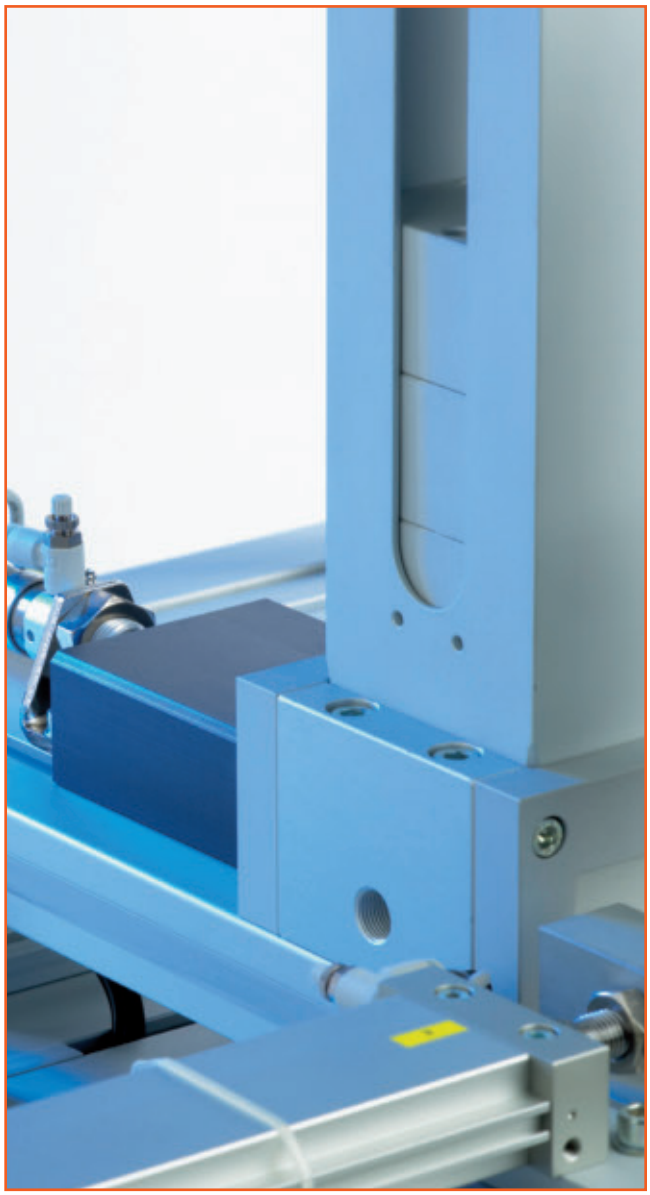
  This last handling device also allows remote maintenance scenarios via a modem or other technologies such as WI-FI, etc.



- The handing systems include a whole series of industrial technologies such as pneumatics, electro-pneumatics, PLCs, sensors, etc.

  This is equipment devised and developed for the acquisition of the following professional skills:

  - Analysis
  - Installation/ assembly
  - Diagnosis and the repair of breakdowns
  - Interpretation and elaboration of documentation
  - PLC programming



- The handling devices from the MAP-200 series, as well as the rest of the SMC International Training equipment, are constructed entirely from industrial materials, so the student works with the same materials as found in the industrial environment.

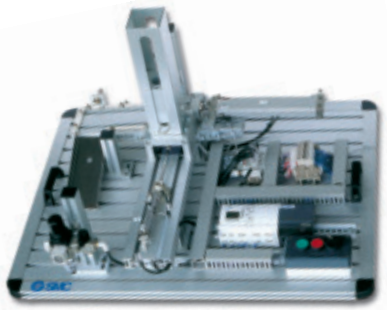
Versions

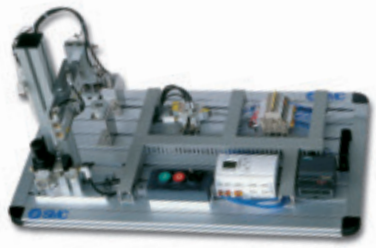
Each training system from the MAP-200 (except for the MAP-205 minicell) series, is presented in three different versions for the user to choose from:

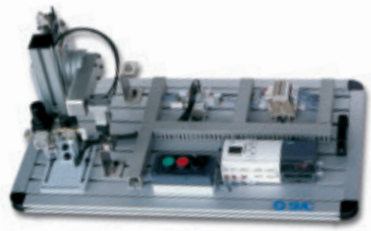
- Without PLC: this contains the entire assembled pneumatic and electro-pneumatic system. The air treatment unit is also included. The PLC is not included in this version.

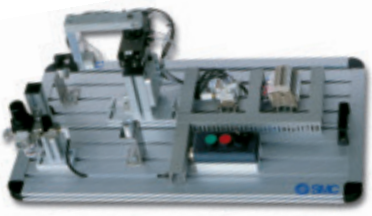
- With PLC: in this case the PLC is incorporated for the maneuver. We have a wide variety of PLC brands. Please consult availability.

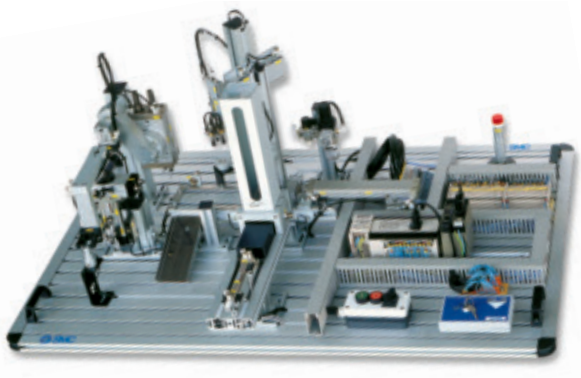
- In assembly kit: in this version, the equipment is supplied with each part conveniently packaged and documented. Thus, in addition to the practical activities proposed for all the versions, the student can carry out the assembly and disassembly of the equipment, guided by the assembly instructions and drawings provided in the documentation. This version does not include the PLC.











Four training systems, four handling applications

MAP-201

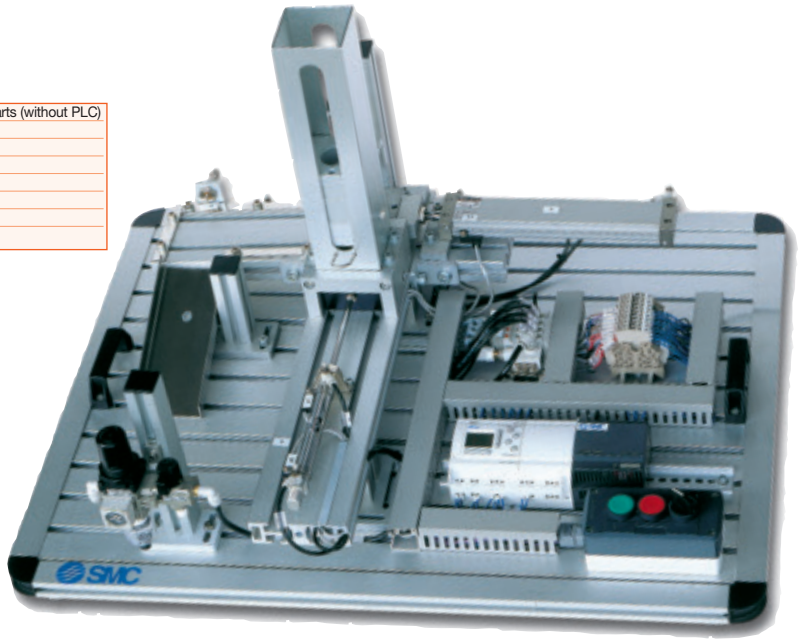
Part feeder with detector and ejector for incorrect parts.

A gravity part feeder houses the parts in its interior. Each part has a non-symmetrical interior housing and is extracted by a pneumatic cylinder. The correct position of the part is verified using a cylinder with a cylindrical part attached. Otherwise, a single acting cylinder removes the part via the evacuation ramp.

The equipment is presented in three versions: with PLC, without PLC and in assembly kit.

· **SAI1001**	MAP-201 Part feeder with detector and ejector for incorrect parts (without PLC)
· **SAI1011**	MAP-201 with SMC Pneu-Alpha PLC
· **SAI1021**	Assembly kit for MAP-201
· **SAI1111**	MAP-201 with Siemens PLC
· **SAI1211**	MAP-201 with Omron PLC
· **SAI1311**	MAP-201 with Mitsubishi PLC
· **SAI1411**	MAP-201 with Allen-Bradley PLC
· **SAI1511**	MAP-201 with Telemecanique PLC

(other configurations on demand, please consult availability)



MAP-202

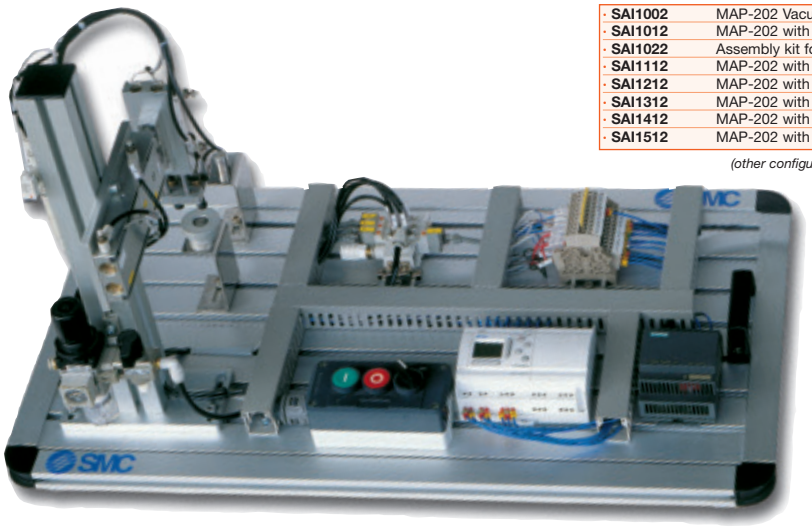
Vacuum-held handling device with two shafts

This is a cartesian handling device with two shafts which moves the part from one position to another while holding it using a set of three vacuum pads.

The equipment is presented in three versions: with PLC, without PLC and in assembly kit.

· **SAI1002**	MAP-202 Vacuum-held handling system with two shafts (without PLC)
· **SAI1012**	MAP-202 with SMC Pneu-Alpha PLC
· **SAI1022**	Assembly kit for MAP-202
· **SAI1112**	MAP-202 with Siemens PLC
· **SAI1212**	MAP-202 with Omron PLC
· **SAI1312**	MAP-202 with Mitsubishi PLC
· **SAI1412**	MAP-202 with Allen-Bradley PLC
· **SAI1512**	MAP-202 with Telemecanique PLC

(other configurations on demand, please consult availability)



MAP-203

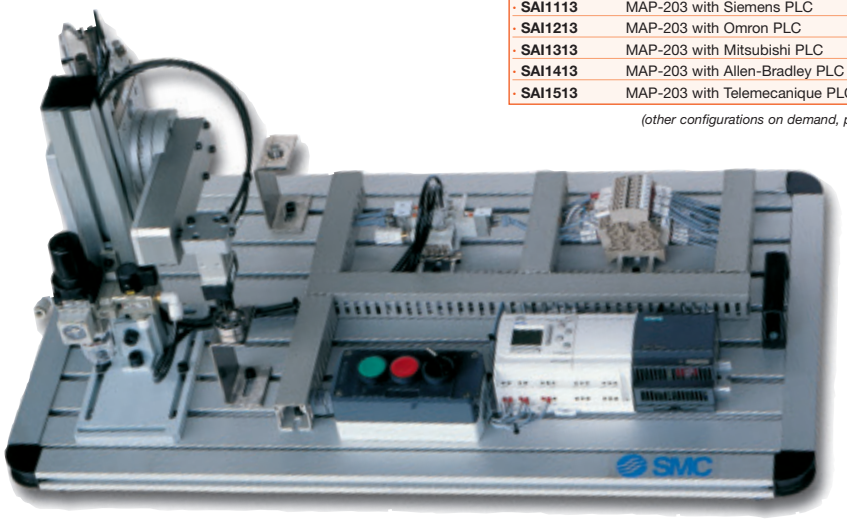
Vertical revolving handling device with internal gripper

This equipment includes a revolving handling device with an internal gripper which moves the part from one position to another.

The equipment is presented in three versions: with PLC, without PLC and in assembly kit.

· **SAI1003**	MAP-203 Vertical revolving handling system with internal gripper (without PLC
· **SAI1013**	MAP-203 with SMC Pneu-Alpha PLC
· **SAI1023**	Assembly kit for MAP-203
· **SAI1113**	MAP-203 with Siemens PLC
· **SAI1213**	MAP-203 with Omron PLC
· **SAI1313**	MAP-203 with Mitsubishi PLC
· **SAI1413**	MAP-203 with Allen-Bradley PLC
· **SAI1513**	MAP-203 with Telemecanique PLC

(other configurations on demand, please consult availability)



MAP-204

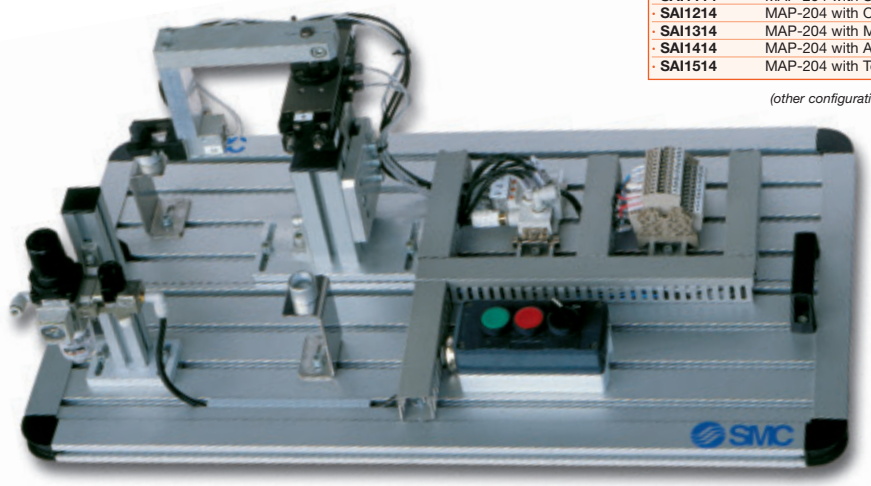
Horizontal rotolinear handling device with external gripper

It consists of a rotolinear handling device fitted with an external gripper which moves a part from one position to another.

The equipment is presented in three versions: with PLC, without PLC and in assembly kit.

· **SAI1004**	MAP-204 Horizontal rotolinear handling system with external gripper (without PLC)
· **SAI1014**	MAP-204 with SMC Pneu-Alpha PLC
· **SAI1024**	Assembly kit for MAP-204
· **SAI1114**	MAP-204 with Siemens PLC
· **SAI1214**	MAP-204 with Omron PLC
· **SAI1314**	MAP-204 with Mitsubishi PLC
· **SAI1414**	MAP-204 with Allen-Bradley PLC
· **SAI1514**	MAP-204 with Telemecanique PLC

(other configurations on demand, please consult availability)



The integrated solution: MAP-205 assembly minicell

- MAP-205 assumes the integration of the four didactic handling systems, in the shape of an assembly minicell.

It carries out the complete assembly process of a series of parts, in this case a turning mechanism comprised of a base, a bearing, a shaft and a lid.

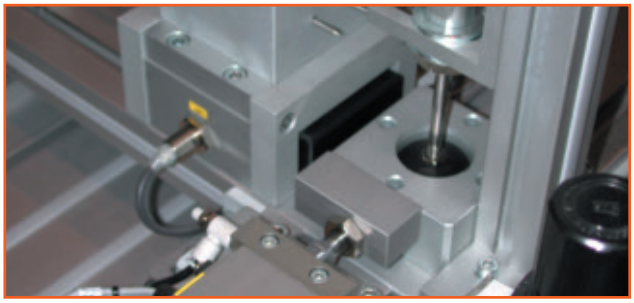
All the modules included in the process are located on a table made of aluminum profile which also includes:

- The solenoid valves and the electronic part for the control of the station
- Control keypad (start, stop, manual/ auto selector)
- Single connections for electricity and air
- Air treatment unit

- Modules included in the equipment:

Base feeder.

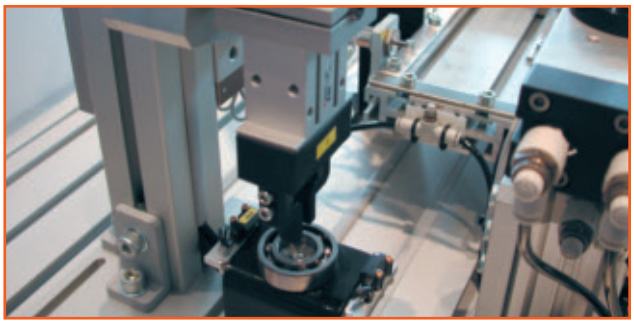
The bases are housed in a gravity part feeder. The process starts by extracting a base and verifying that the position is correct. If it is not in the correct position, it is pushed towards the evacuation ramp. If it is in the correct position, it is moved to the insertion point.



Bearing assembly.

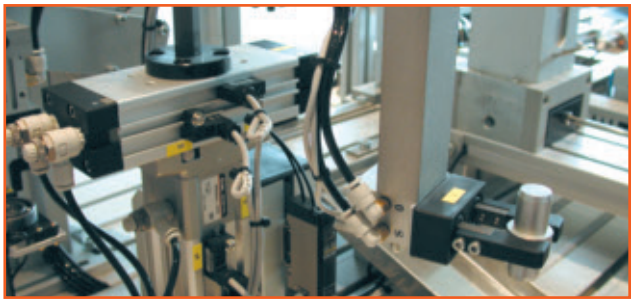
By using a rack and pinion type revolving handling device, which detects an angle of 180º, a bearing is inserted inside the base coming from the previous module.

The presence of the bearing in the initial position is verified by a miniature photocell. If affirmative, the gripper arm attached to the handling device holds the bearing and inserts it into the base.



Insertion of the shaft

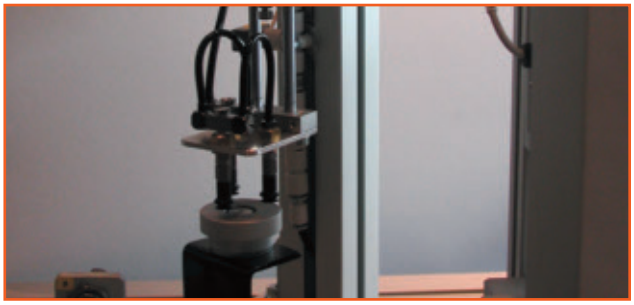
A rotolinear handling device is used during this phase of the process, having verified the presence of the part by using a fiber optic photocell. The moving of the part is carried out using a gripper attached to the rotolinear handling device.

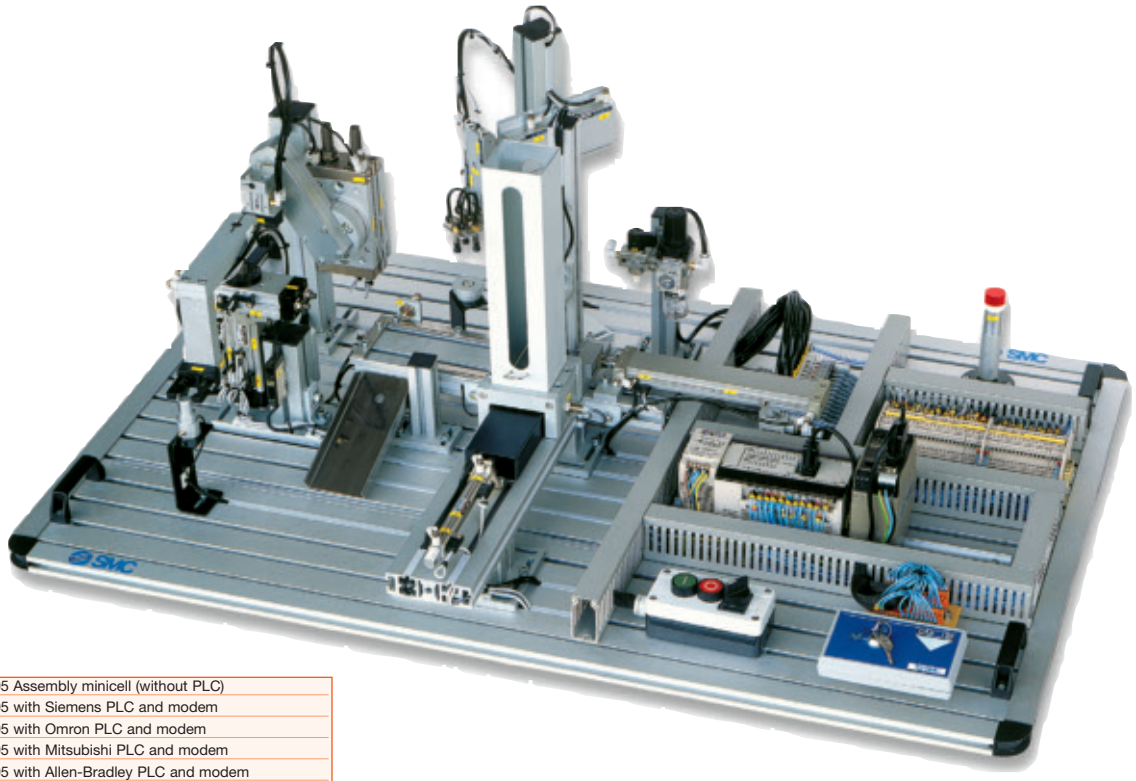


Positioning of the lid

The last assembly operation is carried out using a handling device consisting of two shaft-shaped cylinders with a plate fitted with three vacuum pads.

Once the lid is positioned, the assembly process will be completed.



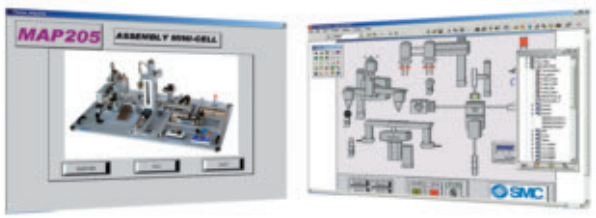


· **SAI1005**	MAP-205 Assembly minicell (without PLC)
· **SAI1115**	MAP-205 with Siemens PLC and modem
· **SAI1215**	MAP-205 with Omron PLC and modem
· **SAI1315**	MAP-205 with Mitsubishi PLC and modem
· **SAI1415**	MAP-205 with Allen-Bradley PLC and modem
· **SAI1515**	MAP-205 with Telemechanique PLC and modem

(other configurations on demand, please consult availability)

SCADA

In order to extend the didactic capacities of the MAP-205 system, the option of a SCADA package is offered, which allows the operations of the different modules to be supervised in real time, from a PC.



· **SAI1030**	SCADA software for remote control - Siemens
· **SAI1031**	SCADA software for remote control - Omron
· **SAI1032**	SCADA software for remote control - Mitsubishi
· **SAI1033**	SCADA software for remote control - Allen-Bradley
· **SAI1034**	SCADA software for remote control - Telemecanique with OPC

(other configurations on demand, please consult availability)

Remote maintenance

MAP-205 allows the study of remote maintenance via a modem or WI-FI system.

Simulation of breakdowns.

The MAP-205 equipment also includes the TROUB-200 breakdown simulation system, which generates up to 16 breakdowns at the touch of a button for the student to detect.

Documentation

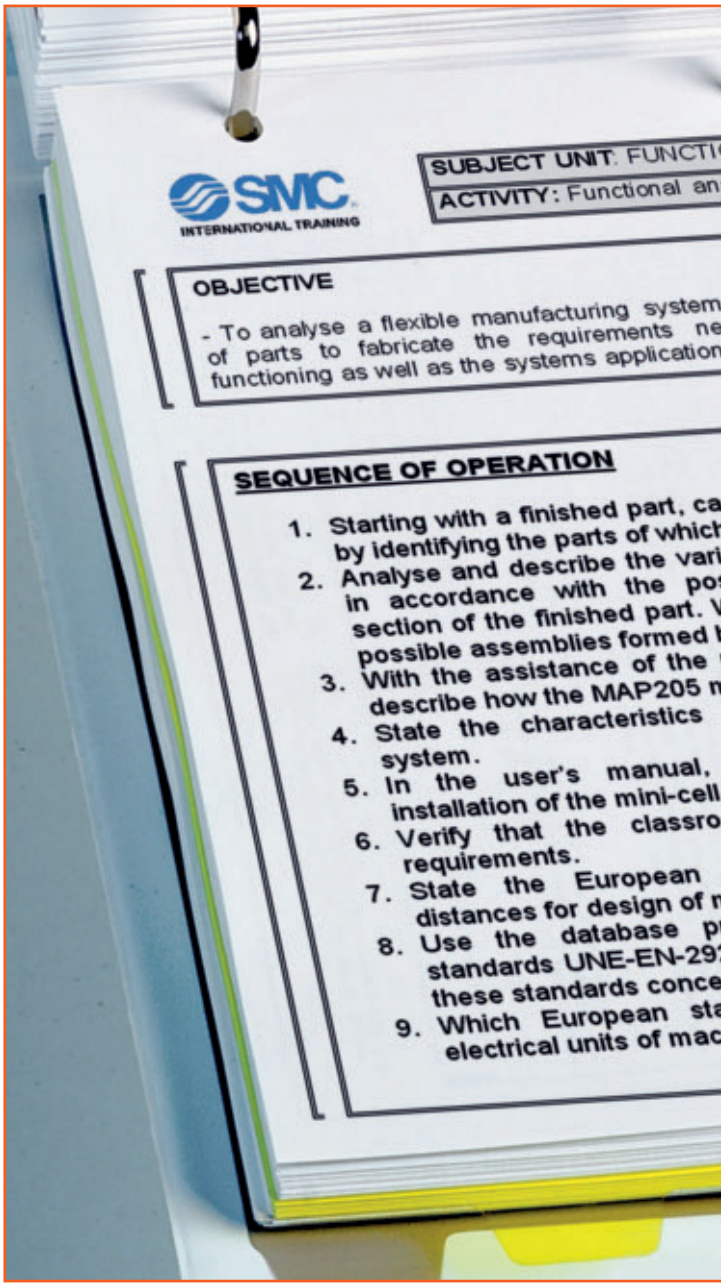
- Each of the handling devices of the MAP-200 series includes a complete set of documentation comprised of the user manual and the exercise manual.

The user manual includes the description of the equipment, all the pneumatic, mechanical, electrical and grafcet drawings and diagrams, as well as the technical specifications of all the industrial components of the equipment.

For the MAP-201, MAP-202, MAP-203 and MAP-204 equipment in the assembly kit, the detailed diagrams of the equipment assembly are also included.

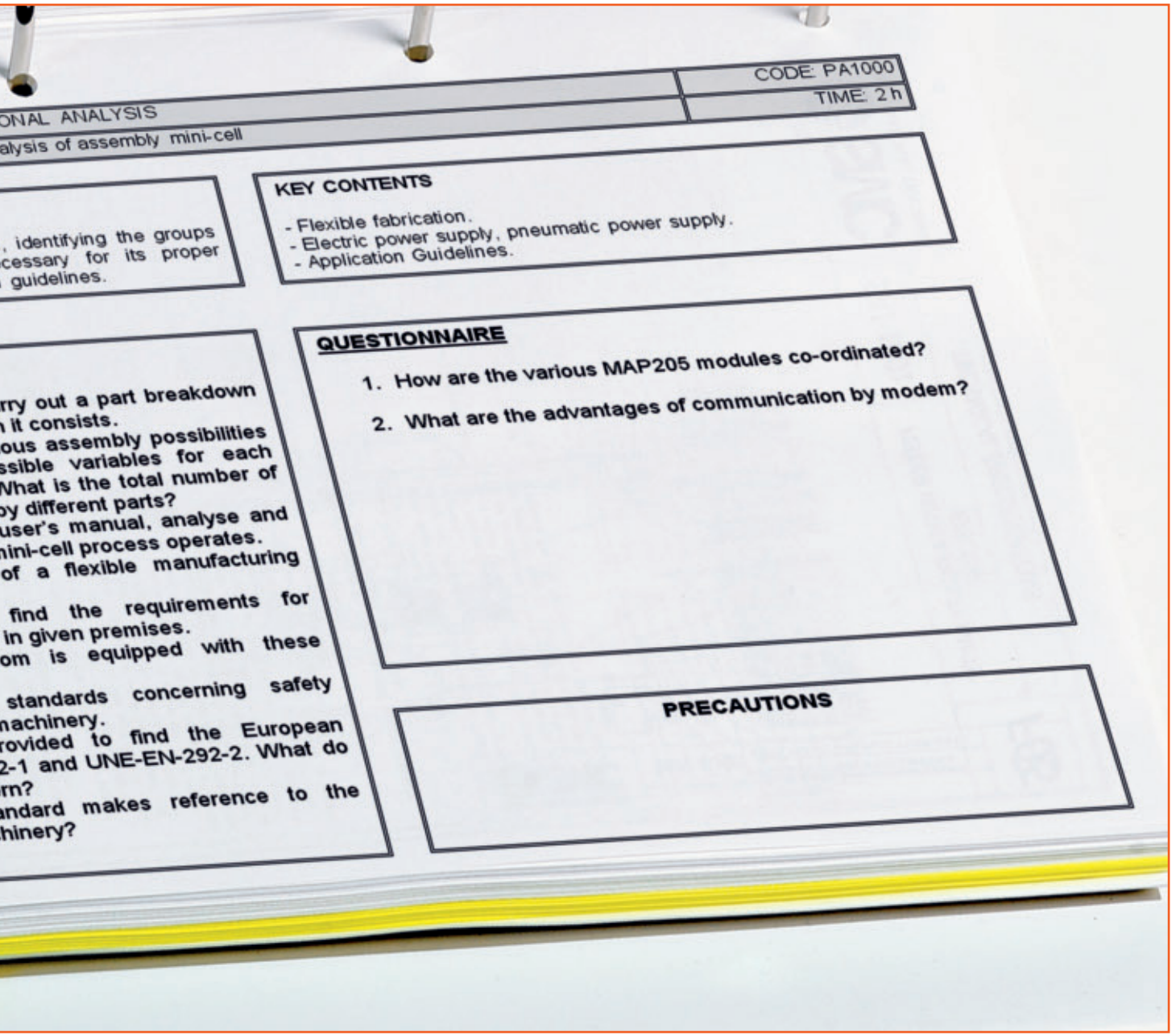
The exercise manual includes a collection of practical activities intended for the development of the aforementioned professional skills.

In the case of the assembly minicell MAP-205, these practical activities are divided into units for the student (which contain the problems and ideas behind the practical exercises), and solutions for the teacher (with the results). The following figure shows an example of a practical activity.


SMC
INTERNATIONAL TRAINING
SUBJECT UNIT: FUNCTI
ACTIVITY: Functional an
OBJECTIVE
- To analyse a flexible manufacturing system
of parts to fabricate the requirements ne
functioning as well as the systems application
SEQUENCE OF OPERATION
1. Starting with a finished part, ca
by identifying the parts of which
2. Analyse and describe the vari
in accordance with the po
section of the finished part.
possible assemblies formed
3. With the assistance of the
describe how the MAP205 m
4. State the characteristics
system.
5. In the user's manual,
installation of the mini-cell
6. Verify that the classro
requirements.
7. State the European
distances for design of m
8. Use the database p
standards UNE-EN-29
these standards conce
9. Which European st
electrical units of mac

Other didactic supports

In addition to the documentation included in each training system, the users can complement their training with the following didactic supports:



autoSIM-200: The shortest way to automation!
Software for training in automation technologies. More information on page 22.

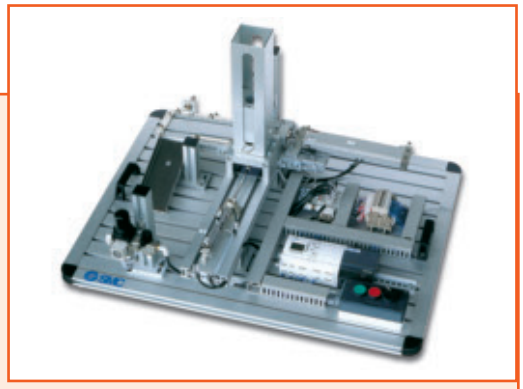
Pneumatic slides:
Set of slides organized in chapters to be used as a support in the laboratory. In CD format or projector slides. More information on page 64.

Case with pneumatic symbols.
Set of magnetic symbols for working on the metal board. More information on page 64

MAP-200

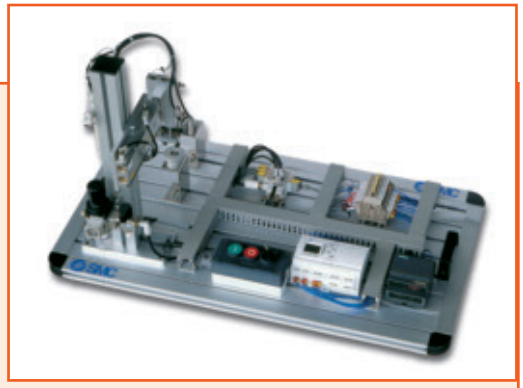
Technical pages

MAP-201:
Part feeder with detector and ejector for incorrect parts



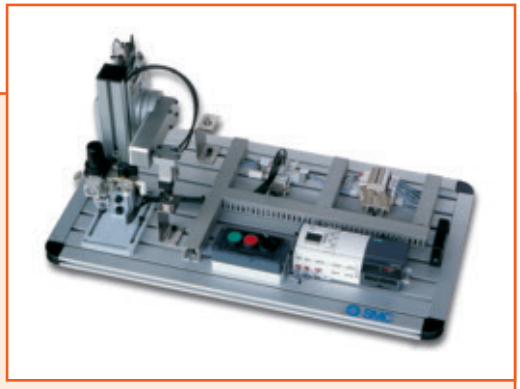
- **Dimensions:** 770x580x445 mm. Approximate weight: 31 Kg.
- **Air treatment unit:** filter with pressure regulator, pressure gauge, throttle and drain valve.
- **Keypad:** start, stop push button and automatic-manual selector.
- **Electric power supply:** 24Vdc.
- **Pneumatic supply pressure:** 0,6MPa.
- **Actuators:**
  - 2 Double acting cylinders.
  - 1 Single acting cylinder.
  - 1 Single acting anti-turn cylinder.
- **Solenoid valve block:**
  - 3 5/2 way single solenoid valves
  - 1 3/2 way single solenoid valve.
- **Sensors:** 4 end of stroke Reed type switches.
- **Regulators:** 6 unidirectional speed controllers.
- **Terminal block:** double connection terminals with additional connections for 2 mm connectors.
- **PLC (only in option "WITH PLC"):** according to the user's choice.
- **Power supply source :** 100-240Vac / 24Vdc (60W).

MAP-202
Vacuum-held handling device with two shafts



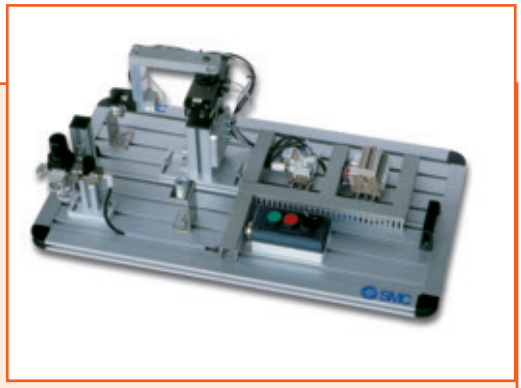
- **Dimensions:** 740x400x445 mm. Approximate weight: 20 Kg.
- **Air treatment unit:** : Filter with pressure regulator, pressure gauge, throttle and drain valve.
- **Keypad:** start, stop push button and automatic-manual selector.
- **Electric power supply:** 24Vdc.
- **Pneumatic supply pressure:** 0,6MPa.
- **Actuators:**
  - 2 dual rod cylinders.
  - 3 vacuum pads with 1 vacuum ejector.
- **Solenoid valve block:**
  - 1 double solenoid valve.
  - 2 single solenoid valves.
- **Sensors:** 4 end of stroke Reed type switches.
- **Regulators:** 4 unidirectional speed controllers.
- **Terminal block:** double connection terminals with additional connections for 2 mm connectors.
- **PLC (only in option "WITH PLC"):** according to the user's choice.
- **Power supply source :** 100-240Vac / 24Vdc (60W).

MAP-203
Vertical revolving handling device with internal gripper



- **Dimensions:** 740x400x445 mm. Approximate weight: 22 Kg.
- **Air treatment unit:** Filter with pressure regulator, pressure gauge, throttle and drain valve.
- **Keypad:** start, stop push button and automatic-manual selector.
- **Electric power supply:** 24Vdc.
- **Pneumatic supply pressure:** 0,6MPa.
- **Actuators:**
  - 1 rotary actuator.
  - 1 internal gripper.
- **Solenoid valve block:**
  - 1 double solenoid valve.
  - 1 single solenoid valve.
- **Sensors:** 2 end of stroke Reed type switches.
- **Regulators:** 2 unidirectional speed controllers.
- **Terminal block:** double connection terminals with additional connections for 2 mm connectors.
- **PLC (only in option "WITH PLC"):** according to the user's choice.
- **Power supply source:** 100-240Vac / 24Vdc (60W).

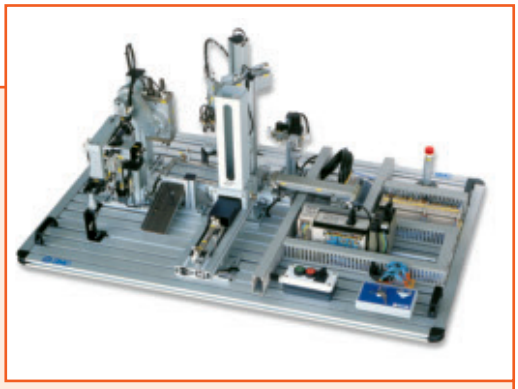
MAP-204
Rotolinear handling device with external gripper



- **Dimensions:** 740x400x445 mm. Approximate weight: 21 Kg.
- **Air treatment unit:** Filter with pressure regulator, pressure gauge, throttle and drain valve.
- **Keypad:** start, stop push button and automatic-manual selector.
- **Electric power supply:** 24Vdc.
- **Pneumatic supply pressure:** 0,6MPa.
- **Actuators:**
  - 1 rotolinear actuator.
  - 1 parallel type gripper.
- **Solenoid valve block:**
  - 3 single solenoid valves.
- **Sensors:** 6 end of stroke Reed type switches.
- **Regulators:** 4 unidirectional speed controllers.
- **Terminal block:** double connection terminals with additional connections for 2 mm connectors.
- **PLC (only in option "WITH PLC"):** according to the user's choice.
- **Power supply source:** 100-240Vac / 24Vdc (60W).

Technical pages

MAP-205
Assembly minicell



- **Dimensions:** 1200 x 720 x 445 mm.
- **Air treatment unit:** Filter 5 µm, with pressure regulator and indicator gauge.
- **Control keypad:** Start, stop, selector, on/off push buttons.

- **Base feeder module:**
  - 2 double acting cylinders, with speed controllers and initial and end position switches. Controlled by solenoid valves.
  - Rectangular section pusher cylinder with speed controllers and end position switch. Controlled by solenoid valve.
  - Auto switches, Reed type.
  - Inductive detector
  - Single acting cylinder with speed controller. Controlled by solenoid valve.

- **Bearing assembly module:**
  - Double rack and pinion rotary actuator with speed controllers and 0º, 90º, and 180º position switch. Controlled by solenoid valve.
  - Fixing arm: parallel type pneumatic grippers with two fingers. Controlled by solenoid valve.
  - Auto switches, Reed type.
  - Barrier type photocell.

- **Insertion of the shaft in the assembly module:**
  - Compact linear and rotary drive cylinder with speed controllers and initial and end position switches during linear movement and 0º and 180º during rotary movement. Controlled by two solenoid valves.
  - Fixing arm: parallel type pneumatic grippers with two fingers. Controlled by solenoid valve.
  - Auto switches, Reed type.
  - Photocell.

- **Positioning of the lid module:**
  - Horizontal shaft: double acting dual rod cylinder with speed controllers and initial and end position switches. Controlled by solenoid valve.
  - Vertical shaft: Double acting dual rod cylinder with speed controllers and initial position switch. Controlled by solenoid valve.
  - Fixing arm: 3 vacuum pads with vacuum ejector. Controlled by solenoid valve.
  - Auto switches, Reed type.
  - PNP output vacuum pressure switch.

- **Electric control panel:**
  - Accessible terminal strip with power supply connections and codified I/O.
  - Station I/O: 24 inputs/ 15 outputs.
  - Power supply source 100-240Vac / 24Vdc (60W).
  - Control PLC: according to the user's choice.